

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>148651-186</b>	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. <b>PCT/JP2004/010124</b>	International filing date (day/month/year) <b>15.07.2004</b>	Priority date (day/month/year) <b>22.07.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>G02B1/04, C08F290/06, 299/02, G02B3/08</b>		
Applicant <b>DAINIPPON INK AND CHEMICALS, INC.</b>		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>9</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																									
<p>4. This report contains indications relating to the following items:</p> <table><tr><td><input checked="" type="checkbox"/></td><td>Box No. I</td><td>Basis of the report</td></tr><tr><td><input type="checkbox"/></td><td>Box No. II</td><td>Priority</td></tr><tr><td><input type="checkbox"/></td><td>Box No. III</td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr><tr><td><input type="checkbox"/></td><td>Box No. IV</td><td>Lack of unity of invention</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Box No. V</td><td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VI</td><td>Certain documents cited</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VII</td><td>Certain defects in the international application</td></tr><tr><td><input type="checkbox"/></td><td>Box No. VIII</td><td>Certain observations on the international application</td></tr></table>		<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand	Date of completion of this report																								
Name and mailing address of the IPEA/JP	Authorized officer																								
Facsimile No.	Telephone No.																								

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

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## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☒ the international application as originally filed/furnished
- ☐ the description:
- pages \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ the drawings:
- sheets \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	1-11	YES
	Claims		NO
Inventive step (IS)	Claims	8	YES
	Claims	1-7, 9-11	NO
Industrial applicability (IA)	Claims	1-11	YES
	Claims		NO

## 2. Citations and explanations (Rule 70.7)

Document 1: JP 2002-356524 A (Dainippon Ink & Chemicals Inc.), 13 December 2002

Document 2: JP 11-240926 A (Mitsubishi Rayon Co., Ltd.), 13 July 1999

Document 3: JP 11-240926 A (Dainippon Ink & Chemicals Inc.; The Inktec Co., Ltd.), 7 September 1999

Document 4: JP 11-236420 A (Tokuyama Corp.), 31 August 1999

Document 5: JP 4-4209 A (Japan Institute of Advanced Dentistry), 8 January 1992

Document 6: JP 3-184001 A (Mitsubishi Rayon Co., Ltd.), 12 August 1991

The invention set forth in claim 1 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report. Document 1 does not mention "a (meth)acrylate represented by general formula (I) (b1)" and "a (meth)acrylate represented by general formula (II) (b2)"; however, document 2 discloses bisphenol di(meth)acrylates represented by general formula (II) (B) (In general formula (II), "H2" on the far left is an error for "CH2".). Document 2 (paragraph

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[0015]) also states that in a bisphenol di(meth)acrylate represented by general formula (II) "In general formula (II), m and n represent the numbers of modifying ethylene oxide or propylene oxide units, with  $2 \leq m + n \leq 12$ . When m + n is less than 2 it becomes difficult to confer adequate flexibility on the resulting photoresin layer; and when m + n exceeds 12 the surface hardness, heat resistance and coefficient of diffraction of the resulting photoresin layer are lowered"; and (paragraph [0016]) indicates that a mixture of two or more bisphenol di(meth)acrylates (B) can be employed. Moreover, using different combinations of m + n in suitable proportions from the point of view of impact resistance and strength is also widely known. See, for example, documents 4-6.

Since documents 1 and 2 address the same technical problem of "raising curability and improving adhesion with base material in the form of a transparent sheet, the "active energy cured type resin compositions" in document 1 and "active energy curable compositions" in document 2 share the fact that they are used in optical items such as lenses, and the inventions disclosed in document 1 and document 2 both belong to the technical field of active-energy-cured resin compositions mainly containing an acrylate resin, and no special impediment is discovered as to the combination thereof, a person skilled in the art could easily conceive of incorporating "a bisphenol di(meth)acrylate represented by general formula (II) (B)" disclosed in document 2 in an "active energy cured type resin composition" disclosed in document 1, in order to confer adequate flexibility and surface hardness.

In addition, the effects of the invention set forth

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in claim 1 do not exceed the sum of the effects of the inventions disclosed in documents 1 and 2, and are such as could be expected by a person skilled in the art.

The invention set forth in claim 2 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report. Documents 1 and 2 do not disclose the "mass ratio of the bifunctional (meth)acrylate (b1) and bifunctional (meth)acrylate (b2)"; however, a mass ratio of 20/80 to 80/20 is a range conventionally adopted when mixing two components, and is not deemed to have any marked action or effect.

Document 1 also does not disclose a "mass ratio for a bifunctional (meth)acrylate (b3) relative to the total of bifunctional (meth)acrylate (b1) and bifunctional (meth)acrylate (b2)"; however, document 2 (paragraph [0023]) discloses 10-45 parts by weight of a bisphenol di(meth)acrylate represented by general formula (II) (B) and 0-30 parts by weight of at least one compound (D) having at least one polymerizable double bond; and the mass ratio of constituent (B) and constituent (D) is comprehended in the range 15/85 to 70/30.

The invention set forth in claim 3 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report, document 1 (paragraph [0030] gives poly(propylene glycol) di(meth)acrylate and the like as a "(meth)acrylate ester of an aliphatic polyhydric alcohol".

The invention set forth in claim 4 does not involve an inventive step in the light of documents 1 to 3, cited

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in the international search report. Document 1 does not mention that "the thermoplastic resin (d) is a polyurethane resin having a glass transition temperature of  $-70^{\circ}\text{C}$  to  $0^{\circ}\text{C}$ . However, document 3 (paragraph [0024]) states that, "From the point of view of flexibility, the polymer is preferably a urethane resin. A urethane resin having a glass transition temperature ( $T_g$ ) of  $-40^{\circ}\text{C}$  to  $60^{\circ}\text{C}$  is preferred, and a  $T_g$  of  $-35^{\circ}\text{C}$  to  $-25^{\circ}\text{C}$  is more preferred". Since document 1 and document 3 both belong to the technical field of energy radiation cured resin compositions, a person skilled in the art could easily conceive of applying a "urethane resin" disclosed in document 3 in an "active energy cured resin composition" disclosed in document 1, in order to confer flexibility (shape recovery).

The invention set forth in claim 5 does not involve an inventive step in the light of documents 1 to 3, cited in the international search report. Document 1 (paragraph [0026]) gives bisphenol epoxy (meth)acrylates as examples of an "epoxy (meth)acrylate having at least two acryloyl groups (a)", and states (paragraph [0037]), "There are no specific restrictions as to the monofunctional (meth)acrylate (c); however, in order to be able to give a high refractive index without detracting from high elasticity, a monofunctional (meth)acrylate having a ring structure (c') is preferred".

The invention set forth in claim 6 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report. Document 1 (paragraph [0042]) states that, "In 100 parts by weight of epoxy

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(meth)acrylate (a') + (meth)acrylate ester of an aliphatic polyhydric alcohol (b') + monofunctional (meth)acrylate, the quantities of each of the constituents are preferably epoxy (meth)acrylate (a') 30-70 parts by weight, (meth)acrylate ester of an aliphatic polyhydric alcohol (b') 5-40 parts by weight, and monofunctional (meth)acrylate 5-35 parts by weight"; and (paragraph [0051]) states that, "The quantity of other resin (e) employed is preferably 1-30 parts by weight in a total of 100 parts by weight of active energy cured resin composition for cast polymerization of the present invention".

Moreover, the "(meth)acrylate ester of an aliphatic polyhydric alcohol (b')" disclosed in document 1 can also include a "bisphenol di(meth)acrylate represented by general formula (II) (B)" disclosed in document 2; and the numerical range specified in claim 6 is such as could be conceived easily by a person skilled in the art.

The invention set forth in claim 7 does not involve an inventive step in the light of documents 1 and 2. Document 1 (paragraph [0047]) cites multifunctional (meth)acrylates such as tri[(meth)acryloylethoxy]phosphate, for example, as "other compounds containing an unsaturated double bond (d)".

The invention set forth in claim 8 involves an inventive step relative to the documents cited in the international search report. In particular, no document discloses "the polyfunctional (trifunctional or more) (meth)acrylate (e) is a (meth)acrylate ester of an aliphatic polyhydric alcohol having an oxypropylene

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structure (e1)"; and due to this feature, this invention in the present invention offers the advantageous effect that "a high degree of crosslinking is possible without detracting from adhesion with plastic base material".

The invention set forth in claim 9 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report. Document 1 does not specifically state the content of "other compounds containing an unsaturated double bond (d)"; however, it mentions (paragraph [0043]) that "in addition to constituents (a)-(c), other compounds containing an unsaturated double bond (d) can be included, with the objective of fine regulation of viscosity or refractive index, for example". The statement "with the objective of fine regulation" suggests a minor content which will manifest an effect, which is deemed to include 1-10 parts by mass.

For the rest, by the same argument as for claim 6, the numerical range specified in claim 9 could be conceived easily by a person skilled in the art.

The invention set forth in claim 10 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report. Document 1 discloses "active energy cured resin compositions for cast polymerization, which can be employed for producing items having a structure consisting of a moulded resin layer formed from a cured resin on a transparent plastic base material, such as producing plastic items, for example, formed sheets, lenses, optical components, optical disks and prisms".



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The invention set forth in claim 11 does not involve an inventive step in the light of documents 1 and 2, cited in the international search report. "Fresnel lens sheets" are known lens sheet materials